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PATENT

Attorney Reference Number 7273-70201-01
Application Number 10/806,130

Claims

Claims 1-5 (Canceled)

6. (Currently amended) A network power manager apparatus of the type useable in a computer network having a host system with a network power manager application adapted to issue network commands and communicate network commands over a network communications connect supporting IP communications, the network power manager apparatus comprising in combination:

- a power supply housing;
- a power manager agent application mounted in ~~association with the~~ power supply housing and being connectable to the network communications connection;
- a plurality of power outlets mounted in the power supply housing; and
- a plurality of intelligent power modules (IPMs) mounted in the power supply housing and connectable to said network communications connection and thereby being in IP communication with said network power manager application through said power manager agent application, each said intelligent power module being adapted to provide power from a power source to a corresponding power outlet among the plurality of power outlets and being in communication with said power manager agent application to provide power cycling on-off of said corresponding power outlet and at least one of power state sensing and load-sensing with respect to said corresponding power outlet in response to one or more commands.

7. (Original) The network power manager apparatus of claim 6 further comprising a serial communications connection supported by a microprocessor, said serial communications connection connecting each of the intelligent power modules to the power manager agent application.

8. (Currently amended) The network power manager apparatus of claim 6 wherein each intelligent power module further comprises a microprocessor connected by an opto-isolator whereby the intelligent power module may independently sense the power state of said corresponding power outlet.

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9. (Currently amended) The network power manager apparatus of claim 8 wherein said microprocessor communicates the power-on status of the IPM-corresponding power outlet to the network power manager application through said power manager agent application as a variable in a managed information base data construct communicated over the network communications connection in accordance with a predefined simple network management protocol.

10. (Currently amended) The network power manager apparatus of claim 6 wherein each of the intelligent power modules further comprises a microprocessor connected by a load sensor that independently senses the load status of the corresponding power outlet.

11. (Original) The network power manager apparatus of claim 10 wherein said microprocessor is adapted to communicate the load status to the network power manager application through the power manager agent application as a variable in a managed information base (MIB) data construct communicated over the network communications connection in accordance with a predefined simple network management protocol (SNMP).

12. (Currently amended) The network power manager apparatus of claim 6 wherein each of the intelligent power modules further comprises a microprocessor in communication with a relay that independently controls the power applied to the corresponding power outlet.

13. (Currently amended) The network power manager apparatus of claim 12 wherein said microprocessor controls the power applied to the corresponding power outlet in response to a variable in a managed information base (MIB) data construct communicated from the network power manager application to the power manager agent application over the network communications connection in accordance with a predefined simple network management protocol (SNMP).

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14. (Currently amended) The network power manager apparatus of claim 6 wherein each intelligent power module further comprises:

a microprocessor in communication with:

a power state sensor that independently senses the power-on status of the corresponding power outlet;

a load sensor that independently senses the load status of the corresponding power outlet; and

a relay that independently controls the power applied to the corresponding power outlet.

15. (Currently amended) The network power manager apparatus of claim 6 wherein each intelligent power module further comprises:

a power supply and clock generator, connected to a load-sensor, a power state sensor, and a relay and that applies a series of alternating current (AC) voltage pulses synchronized to a source of AC power to the corresponding power outlet with an on/off switch, said load sensor being adapted to sense the presence of a series of AC current pulses that result if said on/off switch is closed;

a microprocessor that analyzes any AC current pulses detected by said load sensor to determine if they resulted from application of the AC voltage pulses; and

an input/output connection connected to said microprocessor that outputs an on/off status indication for said switch.

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16. (Currently amended) The network power manager apparatus of claim 6 wherein each intelligent power module further comprises:

power output terminals with a power switch;

a synchronized pulse generator connected to said terminals that applies an alternating pulsed voltage synchronized to an incoming alternating current power source to the corresponding power outlet;

a load sensor connected in series with said terminals and said power supply/clock generator; and

a microprocessor connected to both said synchronized pulse generator and the load sensor, said microprocessor being adapted to determine if a current sensed by said load sensor resulted from both said switch being closed and application of the alternating pulsed voltage from said synchronized pulse generator.

17. (Original) The network power manager apparatus of claim 16 wherein said power state sensor comprises a voltage state determination processor in voltage determination communication with a power relay in power controlling communication with said corresponding power outlet.

18. (Original) The network power manager apparatus of claim 16 wherein said synchronized pulse generator further comprises a clock generator with an output that coincides with each zero-crossing of the incoming alternating current power.

19. (Original) The network power manager apparatus of claim 16 wherein said load sensor further comprises an opto-isolator and a sense resistor.

20. (Original) The network power manager apparatus of claim 19 wherein said microprocessor further comprises a data input connected to said opto-isolator and a data output connected to control the synchronized pulse generator.

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21. (Currently amended) A network power manager apparatus of the type useable in a computer network having a host system with a network power manager application adapted to issue network commands and communicate network commands over a network communications connection, the network power manager apparatus comprising in combination:

a power manager agent application connectable to the network communications connection;

a plurality of power outlets; and

a plurality of intelligent power modules (~~IPM~~) (IPMs) connectable in communication with said network power manager application, each said intelligent power module being adapted to provide power from a power source to a corresponding power outlet among the plurality of power outlets and being in communication with said power manager agent application to provide power cycling on-off of said corresponding power outlet and at least one of power-on sensing and load-sensing with respect to said corresponding power outlet in response to one or more commands.

22. (Original) The network power manager apparatus of claim 21 further comprising a serial communications connection supported by a microprocessor, said serial communications connection being adapted to connect each of the intelligent power modules to the network power manager application.

23. (Currently amended) The network power manager apparatus of claim 21 wherein each intelligent power module further comprises a microprocessor connected by an opto-isolator whereby the intelligent power module may independently sense the power-on status of said corresponding power outlet.

24. (Currently amended) The network power manager apparatus of claim 23 wherein said microprocessor communicates the power-on status of the IPM-corresponding power outlet to the network power manager application through said power manager agent application as a variable in a managed information base data construct communicated over the network communications connection in accordance with a predefined simple network management protocol.

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25. (Currently amended) The network power manager apparatus of claim 21 wherein each of the intelligent power modules further comprises a microprocessor connected by a load sensor that independently senses the load status of the corresponding power outlet.

26. (Original) The network power manager apparatus of claim 25 wherein: said microprocessor communicates the load status to the network power manager application through the power manager agent application as a variable in a managed information base (MIB) data construct communicated over the network communications connection in accordance with a predefined simple network management protocol (SNMP).

27. (Currently amended) The network power manager apparatus of claim 21 wherein each of the intelligent power modules further comprises a microprocessor in communication with a relay that independently controls the power applied to the corresponding power outlet.

28. (Currently amended) The network power manager apparatus of claim 27 wherein said microprocessor controls the power applied to the corresponding power outlet in response to a variable in a managed information base (MIB) data construct communicated from the network power manager application to the power manager agent application over the network communications connection in accordance with a predefined simple network management protocol (SNMP).

29. (Currently amended) The network power manager apparatus of claim 21 wherein each intelligent power module further comprises:

a microprocessor in communication with:

a power on sensor that independently senses the power-on status of the corresponding power outlet;

a load sensor that independently senses the load status of the corresponding power outlet; and

a relay that independently controls the power applied to the corresponding power outlet.

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30. (Currently amended) The network power manager apparatus of claim 21 wherein each intelligent power module further comprises:

a power supply and clock generator connected to a load-sensor, a power on sensor, and a relay, said power supply and clock generator applying a series of alternating current (AC) voltage pulses synchronized to a source of AC power to the corresponding power outlet with an on/off switch, said load sensor being adapted to sense the presence of a series of AC current pulses that result if said on/off switch is closed;

a microprocessor that analyzes any AC current pulses detected by said load sensor to determine if they resulted from application of the AC voltage pulses; and

an input/output connection connected to said microprocessor that outputs an on/off status indication for said switch.

31. (Currently amended) The network power manager apparatus of claim 21 wherein each intelligent power module further comprises:

power output terminals with a power switch;

a synchronized pulse generator connected to said terminals that applies an alternating pulsed voltage synchronized to an incoming alternating current power source to the corresponding power outlet;

a load sensor connected in series with said terminals and said power supply/clock generator; and

a microprocessor connected to both said synchronized pulse generator and the load sensor, said microprocessor being adapted to determine if a current sensed by said load sensor resulted from both said switch being closed and application of the alternating pulsed voltage from said synchronized pulse generator.

32. (Currently amended) The network power manager apparatus of claim 31 wherein said power state sensor comprises a voltage state determination processor in voltage determination communication with a power relay in power controlling communication with said corresponding power power outlet.

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33. (Original) The network power manager apparatus of claim 31 wherein said synchronized pulse generator further comprises a clock generator with an output that coincides with each zero-crossing of the incoming alternating current power.

34. (Original) The network power manager apparatus of claim 31 wherein said load sensor further comprises an opto-isolator and a sense resistor.

35. (Original) The network power manager apparatus of claim 34 wherein said microprocessor further comprises a data input connected to said opto-isolator and a data output connected to control the synchronized pulse generator.

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36. (Currently amended) A network power manager apparatus of the type useable in a computer network having a host system with a network power manager application adapted to issue network commands and communicate network commands over a network communications connection supporting IP communications, the network power manager apparatus comprising in combination:

a power supply housing;

a power manager agent application mounted in the housing and being connectable to the network communications connection;

a plurality of power outlets mounted in the power supply housing; and

a plurality of intelligent power modules (IPMs) mounted in the power supply housing and connectable to said network communications connection and thereby being in IP communication with said network power manager application through said power manager agent application, each said intelligent power module being adapted to provide power from a power source to a corresponding power outlet among the plurality of power outlets and being in communication with said power manager agent application to provide power cycling on-off of said corresponding power outlet and at least one of power state sensing and load-sensing with respect to said corresponding power outlet in response to one or more commands, said power state sensor having a voltage state determination processor in voltage determination communication with a power relay in power controlling communication with said corresponding power outlet, said intelligent power module being in power state reporting communication with the network power manager application through said power manager agent application through one or more variables in a managed information base data construct communicated over the network communications connection in accordance with a predefined simple network management protocol.

37. (Original) The network power manager apparatus of claim 36 in which the voltage state determination processor comprises a microprocessor portion controllably communicating with said power relay.

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38. (Original) The network power manager apparatus of claim 37 in which the network communications connection is a serial connection providing serial communication between the network power manager application and the power manager agent application.